

### **ABSTRACT OF THE DISCLOSURE**

The present invention provides a relatively simple etalon testing system and process for measuring cavity error of etalons to high precision. It works equally well on solid and air-spaced designs. This invention should be a great aid in the manufacture of high performance etalons, separating out the geometric and reflectivity finesses. The present invention permits measurement of etalon spacings to an accuracy of better than  $\lambda/1000$  (i.e., about 63 picometers [ $6.3 \times 10^{-11}$  m] when using a HeNe test laser). In a preferred process an etalon under examination is mounted on a rotational stage illuminated with a collimated beam from a HeNe laser. Reflections from the etalon are imaged on a screen to produce interference fringes which are monitored by a CCD camera. The etalon is then pivoted about an axis perpendicular to the laser beam and images of the interference patterns are recorded periodically to produce a plot of intensity vs. pivot angle over a pivot range sufficient to include at least one extinction cycle. (Extinction occurs when the etalon is positioned at such an angle that interference in the etalon causes almost complete extinction of the reflected beam). The interference pattern, as a function of pivot angle, are then analyzed to determine the etalon spacing.